Lower Lower Miocene Progradational Play
LM1 P1, #2661
Lenticulina hanseni

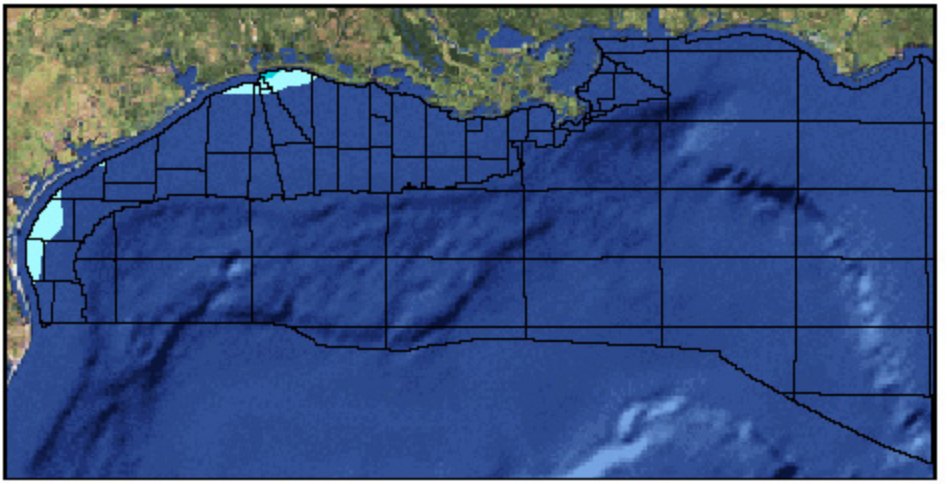

Figure 335. LM1 P1 map showing location of play. Play limit shown in light cyan; hydrocarbon limit shown in dark cyan.

Overview

The Lower Lower Miocene Progradational Play (LM1 P1) contains reserves of 74.468 Bcfg and 0.835 MMbo (14.085 MMBOE) in 15 sands in five fields. The play extends discontinuously across the modern GOM shelf from the South Padre Island to East Cameron Area (Figure 335).

Description

LM1 P1 is defined by (1) a progradational depositional style representing major regressive episodes in which sediments outbuild onto the shelf and slope and (2) the LM1 Chronozone, the top of which is defined by the *Lenticulina hanseni* biozone (Figure 8).

LM1 P1 comprises two separate areas on the modern GOM shelf in the Federal OCS: (1) a western area that extends discontinuously from the northwestern-most South Padre Island to the northeastern corner of the Matagorda Island Area offshore Texas and (2) an eastern area that extends continuously from the High Island Area offshore Texas to the northwestern East Cameron Area offshore Louisiana (Figure 335). Hydrocarbons have been encountered in the Sabine and West Cameron Areas.

Depositional systems included the North Padre Delta System in the southern Texas area and the Calcasieu Delta System along the Texas-Louisiana border (Galloway et al., 1986). No aggradational or retrogradational sediments are identified for the LM1 Chronozone, presumably because the delta systems had prograded only far enough basinward through LM1 time to deposit progradational and deep-sea fan sediments in the Federal OCS.

Play Limits

Updip and along strike, LM1 P1 continues onshore into Texas and Louisiana. LM1 P1 deposits grade into the sediments of the Lower Lower Miocene Fan 1 Play (LM1 F1) in a downdip direction.

Depositional Style

Sediments deposited predominantly on the shelf characterize LM1 P1, with less common, generally finer-grained sediments deposited on the upper slope also occurring. These sediments represent major regressive episodes in which outbuilding of both the shelf and the slope occurs. Rare, retrogradational, reworked sands with a thinning and backstepping log signature cap the play. Because of their rarity, these retrogradational sands are included as part of LM1 P1.

The LM1 progradational section reaches a thickness of over 4,000 ft, but sand development throughout the area is poor and limited in areal extent. Productive LM1 P1 sands formed primarily as delta-fringe deposits. These sands exhibit an upward-coarsening log character and are usually only a few hundred feet thick, though they locally occur as stacked sands that are as much as 1,000 ft thick. The thickest, sand-dominated intervals probably represent multiple episodes of delta-lobe switching and progradation. The sand-rich sequences in LM1 P1 are often overlain and underlain by thick marine shales that are a few hundred to a few thousand feet thick. Though not productive in LM1 P1, progradational facies also comprise channel/levee complexes, crevasse splays, distributary mouth bars, and shelf blanket sands.

Structural Style

The majority of fields in LM1 P1 are structurally associated with normal faults. Other less common structures are associated with growth faults with rollover anticlines, and rotational slump blocks.

Quantitative Attributes

On the basis of reserves calculations, LM1 P1 contains 94% gas and 6% oil (condensate). The 15 sands in the play comprise 19 reservoirs, all of which are nonassociated gas. All reserves are proved and estimated to be 74.468 Bcfg and 0.835 MMbo (14.085 MMBOE) (Table 161). These reserves account for only 3% of the reserves for the LM1 Chronozone.

Cumulative production from LM1 P1 totals 38.554 Bcfg and 0.576 MMbo (7.436 MMBOE) from 12 sands in four fields. This production accounts for only 2% of the LM1 Chronozone's total production. Remaining proved reserves in the play are 35.914 Bcfg and 0.259 MMbo (6.649 MMBOE) in 6 sands in two fields.

Table 162 summarizes that water depths of the fields in LM1 P1 range from 17-37 ft, and play interval discovery depths vary from 10,650-12,603 ft, subsea. Additionally, porosity and water saturation range from 18-31% and 17-45%, respectively.

	No. of Sands	Oil (MMbbl)	Gas (Bcf)	BOE (MMbbl)
Proved	15	0.835	74.468	14.085
Cum. production	12	0.576	38.554	7.436
Remaining proved	6	0.259	35.914	6.649
Unproved	0	0.000	0.000	0.000

Table 161. LM1 P1 reserves and cumulative production.

15 Sands	Min	Mean	Max
Water depth (ft)	17	24	37
Subsea depth (ft)	10,650	11,708	12,603
Reservoirs per sand	1	1	2
Porosity	18%	24%	31%
Water saturation	17%	31%	45%

Table 162. LM1 P1 sand attributes. Values are volume-weighted averages of individual reservoir attributes.

Exploration History

LM1 P1 has a 35-year history of discoveries (Figure 336). Sand discoveries have been sporadic throughout the play's history. The first sands in the play were discovered in 1964 in the West Cameron 17 Field. The maximum number of sands discovered in any year occurred in 1965 with five sands from two fields, adding the maximum yearly reserves of 7.237 MMBOE. This includes the largest sand in the play in the West Cameron 45 Field. This sand contains an estimated 2.457 MMBOE

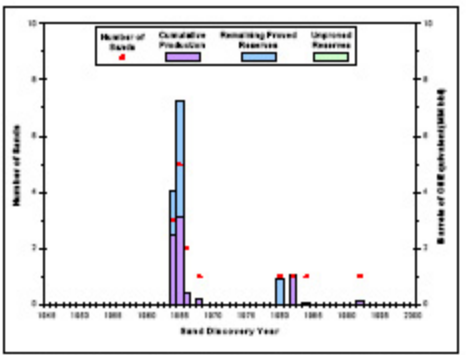

Figure 336. LM1 P1 exploration history graph showing reserves and number of sands discovered by year.

(Figure 337). In fact, 85% of the play's reserves were added in the 1960's. The mean sand size for the play is 0.939 MMBOE. The most recent sand was found in 1992.

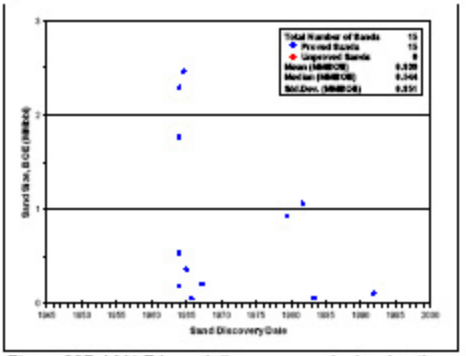

Figure 337. LM1 P1 sand discovery graph showing the size of sands discovered by year.

Production History

LM1 P1 has a 34-year history of production (Figure 338). Production began in 1965, peaked within five years and has fluctuated greatly since then. A significant increase in production occurred in 1994. LM1 P1 production has steadily declined to about 10% of its 1994 total.

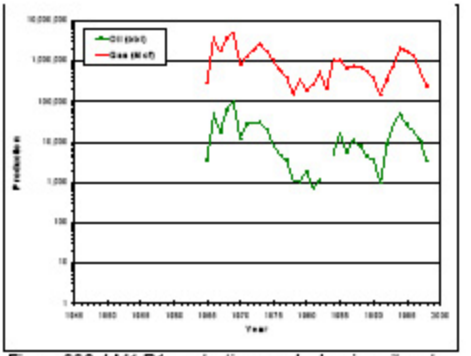

Figure 338. LM1 P1 production graph showing oil and gas production by year.